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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/717,567	11/21/2000	Paul A. Kohl	BFGBP0217US	2128

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HUDAK, SHUNK & FARINE, CO., L.P.A.  
2020 FRONT STREET  
SUITE 307  
CUYAHOGA FALLS, OH 44221

EXAMINER

MITCHELL, JAMES M

ART UNIT PAPER NUMBER

2813

DATE MAILED: 05/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H/A

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/717,567	KOHL ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	James M. Mitchell	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 59-74 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 59-74 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

1. This office action is in response to applicant's arguments filed December 27, 2005.

#### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 59-65, 67 and 72-73 are rejected under 35 U.S.C. 102(b) as being anticipate by Masaaki (JP 62-005643).

4. Masaaki (Fig.1) discloses:

(cl. 59, 61, 67, 74) a semiconductor device comprising: a substrate (1); a patterned layer (3-5) includes a regions (i.e. left and to the right of gap) thereof bordered by air gaps (7); and an overcoat layer (2) overlying the patterned layer of conductive material and the air gap, the overcoat layer having a portion thereof overlying the conductive material in the region bordered by the air gaps, and said portion extending below the height (i.e. top of gap) of the adjacent air gaps, and the air gaps are of a uniform width over the height thereof (i.e. interpreted to mean the width in the uppermost region of gap is uniform; see Fig. 1);

(cl. 60) and the conductive material forms leads/wiring of a semiconductor device  
(English Title);

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(cl. 62-64) wherein the overcoat is a dielectric/non-conducting, silicon dioxide material (Eng. Abstract);

(cl. 63) and a surface (i.e. portion defining gap) of the conductive material adjacent air gap is covered by a film of non-conducting material;

(cont. cl. 67) and the air gaps extend below the conductive material (i.e. below wiring; Fig. 1);

5. With respect to the intended use limitation of claim 65 that "...the non-conducting material controls corrosion," the prior art forms the same structure as claimed. As such, the intended use limitation does not impart patentability, since it has been held that the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

6. With respect to claims 72 and 73, although Masaaki<sup>1</sup> has the same structure as that claimed, Masaaki does not appear to explicitly disclose the process limitation "such as" the conductive layers being patterned and the semiconductor device formed by removing a sacrificial material from a pre-cursor made in accordance with a "method comprising the steps of: (A) forming a patterned layer of the sacrificial material on a substrate corresponding to a pattern of air gaps to be formed in the semiconductor structure..." "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of

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<sup>1</sup> Avanzino was mistakenly referenced and has now been omitted, because the rejection was drawn only to Masaaki as indicated in the rejections heading. The change in name does not change the scope of the rejection, because the rejection based on the limitation being drawn to the process remains the same.

a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

7. Claim 68-70 are rejected under 35 U.S.C. 102(b) as being anticipated by Avanzino (U.S 5,776,834).

8. Avanzino (Fig 16) discloses a semiconductor device comprising: a substrate (11,15); a patterned layer (12) of conductive material disposed on the substrate and having a region thereof bordered by air gaps (i.e. not labeled); and an overcoat layer (20) overlying the patterned layer of conductive material and the air gap, the overcoat layer having a portion thereof overlying the conductive material in the region bordered by the air gaps; and wherein a surface of the conductive material adjacent a respective air gap is covered by a discrete film (26) of [also cl. 69, 70] silicon dioxide, non-conducting material (Col. 7, Lines 6-8) that does not extend over the conductive material beyond (i.e. interpreted to mean that film extend to a greater distance/height than gap) the air gap that controls corrosion of the surface of the conductive material covered by the film, wherein the film controls corrosion, see paragraph 6.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 66 and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masaaki (JP62-005643).

11. Masaaki discloses the elements stated in paragraphs 4-6 of this office action and further a thickness of the film (i.e. three dimensional) and the substrate having a planar extent (i.e. top surface of substrate, 11 is planar), but does not appear to explicitly disclose that the non-conducting material has a thickness of about 100 Å or that upper sides of the gap are parallel to the planar extent.

12. Since applicant has not disclosed that its dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, it would have been obvious to form the film at the claimed thickness or gap with the claimed shape, since it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

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13. Claims 71 and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avanzino (U.S 5,776,834).

14. Avanzino discloses the elements stated in paragraph 8 of this office action and further a thickness of the film (i.e. three dimensional) and the substrate having a planar extent (i.e. top surface of substrate, 11 is planar), but does not appear to explicitly disclose that the non-conducting material has a thickness of about 100 Å or that upper sides of the gap are parallel to the planar extent.

15. With respect to the claimed size and shape, see paragraph 13 of this office action.

16. Claims 68-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masaaki<sup>2</sup> (JP62-005643) in combination with Avanzino (U.S. 5,776,834).

17. Masaaki discloses the elements stated in paragraphs 4-6 of this office action, but does not appear to show a discrete film of non-conducting material that does not extend over the conductive material and beyond the air gap (i.e. interpreted to mean that film extend to a greater distance/height than gap).

18. Avanzino utilizes (as indicated *supra*) a discrete film (26) of silicon dioxide, non-conducting material that does not extend over the conductive material beyond the air gap (Fig. 16).

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<sup>2</sup> Likewise the previous cited art, Machida (JP63-098134) could have been alternatively used as the primary reference for claims 68-71.

19. It would have been obvious to one of ordinary skill in the art to incorporate a discrete film in the manner taught by Avanzino in order to eliminate hillocks as taught by Avanzino (Col. 7, Lines 4-6).

20. With respect to the claimed thickness of claim 71, see paragraph 12.

### ***Response to Arguments***

21. Applicant's arguments filed December 27, 2005 have been fully considered but they are not persuasive. Applicant contends two points that admittedly while Masaaki appears to show uniform air gaps that it does not disclose how and therefore it is "not enabled", secondly that the prior art does not show "nonconductive material that does not extend over the conductive material beyond the air gap," because examiner's interpretation "in effect reads the words over the conductive material out of the claim." Lastly, with respect to claim 74 that the air gap had upper sides parallel to substrate, where the shape was found obviousness for a lack of criticality, applicant has contended, "the skilled person will appreciate...performance characteristics," examiner disagrees.

22. With respect to applicant's argument that Masaaki cannot be relied on based on non-enablement, because patents are presumed valid pursuant to 35 U.S.C. 282 and enablement is a function of a patentability, applicant's arguments do not overcome that presumption. See also MPEP 2145 [R-3]. With respect to comment of claims 72 and 73 referencing the mistake in patent name, see footnote 1. With respect to claim the limitation "...beyond air gap," although examiner concurs that upon cursory review of



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the application that he suggested adding discrete to distinguish the non-conducting film during an interview, upon further review of the claim it was found that Avanzino anticipated the claim. Applicant has argued that examiner has disregarded the limitation "over the conductive material," in effect contending that the non-conductive material cannot be over the conductive material. Examiner disagrees. The inclusion of the phrase "**beyond** [emphasis mine] the air gap" further limits the claim. There are no grammatical indicators or use of punctuation to limit that the non-conductive material is never over the conductive material, but rather the limitation is that it is not "...beyond the air gap." Because the broad scope<sup>3</sup> of the claim encompasses a non-conducting material on a conductive material so long as it has a height/distance less than the air gap, applicant is found unpersuasive and the rejection deemed proper. With respect to criticality, applicant has relied on mere conjecture; absent extrinsic evidence<sup>4</sup> applicant's arguments cannot overcome examiner's prima facie case of obviousness. See M.P.E.P 21458 [R-3]. Lastly, as for the combination of Masaaki and Avanzino, applicant contended that the rejection should be withdrawn, because Avanzino did not show the claimed features. Because examiner disclosed how indeed Avanzino showed the claimed features as indicated supra, the rejection is deemed proper.

### ***Conclusion***

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<sup>3</sup> Based on the plain an ordinary meaning.

<sup>4</sup> e.g. 3<sup>rd</sup> party affidavits

23. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jmm/  
May 29, 2001

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